

12

EUROPEAN PATENT APPLICATION

21 Application number: 85200502.4

51 Int. Cl.⁴: **F 25 D 25/02**

22 Date of filing: 01.04.85

30 Priority: 05.04.84 IT 2144784 U

71 Applicant: **N.V. Philips' Gloeilampenfabrieken,**
Groenewoudseweg 1, NL-5621 BA Eindhoven (NL)

43 Date of publication of application: 09.10.85
Bulletin 85/41

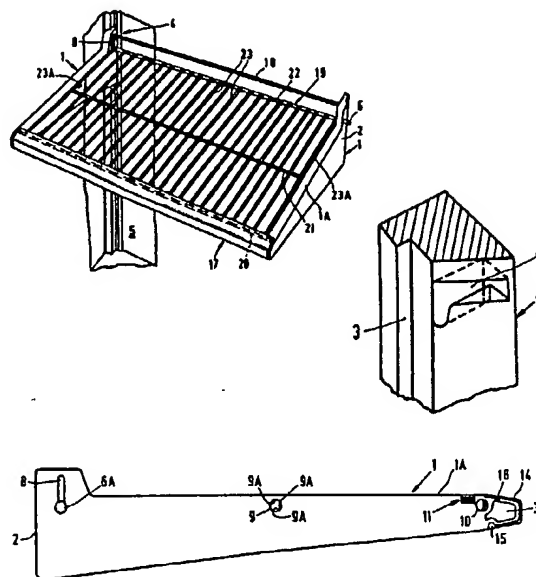
72 Inventor: **Casoli, Firenze, INT. OCTROOIBUREAU B.V.**
Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL)
Inventor: **Marzano, Stefano, INT. OCTROOIBUREAU B.V.**
Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL)

84 Designated Contracting States: **DE FR GB SE**

74 Representative: **Bos, Kornelia Sjoerd et al,**
INTERNATIONAAL OCTROOIBUREAU B.V.
Prof. Holstlaan 6, NL-5658 AA Eindhoven (NL)

54 **Removable shelf, particularly for a refrigerator.**

57 A shelf constructed to be removably attached to supporting means to be supported thereon in the manner of a cantilever, said shelf comprising mutually symmetrical plastics side pieces (1) provided with lateral projections (6) which can be inserted into seats (7) in a pair of supports (4), and which engagement means (6A, 8, 9, 10, 11, 30) for at least one element (19) for interconnecting said side pieces (1).



ACTORUM AG

EP 0 157 461 A2

Removable shelf, particularly for a refrigerator.

The invention relates to a shelf constructed to be removably attached to supporting means to be supported thereon in the manner of a cantilever, particularly but not exclusively a shelf for a domestic refrigerator.

5 Refrigerators are known which comprise in their refrigerated compartment or compartments a series of removable shelves generally formed from metal rods welded at right angles to each other. In some cases the shelves are supported both at their front and at their rear in seats provided
10 in strip elements fixed to the walls of the preservation compartment or compartment of the refrigerator. One example of this known construction is described in German patent application DE-OS 2.737.546. For this purpose, the shelves in question are each provided with transverse rods of
15 greater length so that the ends of these rods project laterally from the shelf. The shelf is supported by the strip elements by means of these projecting ends, which are inserted into rack-like seats. The shelf can be removed from the strips when required for cleaning or for changing
20 its level.

In another known construction, the shelves are supported in the manner of cantilevers on two columns which are fixed to the rear wall of the refrigerated compartment and are provided with a series of slots (known as "racks")
25 in which suitable teeth provided on the shelf are removably engaged. An example of this construction is described in USA patent specification 3,707,317.

A drawback of the first known construction is that mounting the strip elements for supporting the shelves
30 requires considerable accuracy, which increases the refrigerator assembly costs.

The second known construction does not have this

drawback, but the engagement teeth provided on the shelves are mechanically rather weak, unless the construction of the shelves is complicated in such a manner that their cost becomes substantial.

5 Various types of shelves can be used in any one refrigerator. For example, one type defines a simple plane, whereas another type comprises a hinged part to enable bottles to be located on the underlying shelf, and a further type comprises guides for drawers and the like. However,
10 these known shelves do not have interchangeable parts and thus special tools are required to produce each type of shelf.

 An object of the present invention is to provide a shelf which is of simple but very reliable construction
15 and assembly to provide a product of good quality at low cost.

 This and further objects which will be more apparent from the detailed description given hereinafter are attained according to the invention with a shelf which is
20 characterized in that it comprises mutually symmetrical plastics side pieces provided with lateral support projections which can be inserted into supports and with engagement means for at least one element which interconnects the two side pieces.

25 The invention will be more apparent from the detailed description given hereinafter by way of example with reference to the accompanying drawings in which :

 Figures 1 and 2 are perspective views of two different embodiments of the shelf according to the
30 invention;

 Figure 3 is a perspective view of the shelf of Figure 1 with a removable drainer support fitted on it;

 Figure 4 is a view of the outer side of one of the side pieces of the shelves shown in the preceding
35 figures;

 Figure 5 is a plan view of the side piece of Figure 4 with its end portions shown sectioned;

Figure 6 is a view to an enlarged scale of the inner side of the front end portion of the side piece of figures 4 and 5, showing in section a metal cover strip which extends along the front boundary of the shelf.

5 Figure 7 is a section on the line VII-VII of Figure 6;

Figure 8 is a view to an enlarged scale of part of a supporting lug which is provided on the side piece of Figures 4 and 7 and which is also visible in
10 Figure 7;

Figures 9 and 10 are an inner side view and another plan view respectively of the side piece of Figures 4 to 7; and

Figure 11 is a perspective view of a detail of
15 a shelf support.

In the figures, the reference numeral 1 indicates narrow elongate side pieces of moulded plastics construction, which each taper towards one end and which, together with other pieces which will be described
20 hereinafter, are common to the embodiments of shelves shown in Figures 1 to 3. The two side pieces of each shelf are mirror-images of one another and thus are mutually symmetrical, so that the description of one side piece is also valid for the other.

25 Each side piece 1 has at its rear end a flat face 2 designed to rest against a flat face 3 of an associated vertical support 4. The side walls of the multi-functional support element for domestic refrigerators which forms the subject matter of a further utility
30 model application filed on the same data by the present applicant can be used for supporting the shelves. Only two such supports are required for supporting the cantilevered shelves; in a domestic refrigerator two supports are disposed in positions corresponding to the two rear vertical
35 corners of the refrigerator preservation compartment 5. Each side piece 1 also comprises on its outer side near the end face 2 a cylindrical lateral projection 6 formed

with an axial through-bore 6A and intended for engagement in slot-like seats 7 in the supports 4. Each of the seats 7 is shaped in the form of an L turned through 90° in a clockwise direction, and a series of these seats spaced
5 vertically above one another is provided in each support 4. When the projections 6 of the side pieces of a shelf are engaged in the selected seats 7 and the end faces 2 of the side pieces are positioned against the faces 3 of the supports 4, the shelf is removably supported in the manner
10 of a cantilever on the two supports.

On its inner side, above the projection 6, each side piece is formed with a vertical slot 8 (see Figures 1 and 5) of limited height. Intermediate its ends each side piece is formed in its inner side with a blind bore 9 of
15 preferably approximately elliptical cross-section. The wall of the bore is formed around part of its circumference with a plurality of axially extending ridges 9A of triangular cross-section and of different heights, the heights being such that the crests of the ridges lie on an
20 imaginary substantially cylindrical surface. The purpose of this constructional arrangement is described hereinafter. Also in its inner side, each side piece is formed near its front end with a blind bore 10 which is identical to the bore 9 and the central axis of which lies in a plane which
25 also contains the central axis situated on the straight line which joins this latter to axes of the bore 9 and the bore 6A in the projection 6 of the side piece. The bore 10 is clearly visible in Figure 6, as are the triangular section ridges 10A of different heights on the wall of the
30 bore and the imaginary cylindrical surface 10B on which the crests of these ridges lie. Each side piece 1 comprises at its upper side near the bore 10, a laterally projecting lug 11 (see Figures 6, 7 and 8) formed with a bore 12
35 which extends parallel to the upper face 1A of the side piece and which is open at one side through a slot 13 in the end of the lug 11, the slot having a width which is smaller than the diameter of the bore 12.

At its front end each side piece 1 is formed with a peripheral recess 14 which extends back into the upper and lower sides of the side piece and is formed there with two transverse grooves 15 and 16 into which are
5 snap-fitted the ends of an elastically deformable sheet-metal cover strip 17 of the U-shaped cross-section which constitutes a front boundary element for the shelf (see Figures 1, 2 and 3) of which the two side pieces 1 form
10 part. The shelf of Figure 1 is completed by a metal rod 18 which serves as a rear boundary element for the shelf, and of which the ends are disposed in the upper ends of the slots 8 in the side pieces and by a grid 19 of metal rods which acts as a support surface for the articles disposed
15 on the shelf. The grid 19 comprises a series of equispaced rods 23, 23A extending parallel to the side pieces 1 and welded to three transverse rods 20, 21, 22. The rods 23 and 23A define the support surface for the articles which are to be placed on the shelf. The two end rods, designated 23A, are snap-fitted into the bores 12 in the
20 lateral lugs 11 of the side pieces 1 by forcing them through the restricted mouths formed by the slots 13. The ends of the three transverse rods 20, 21, 22 project beyond the two end rods 23A, and these projecting ends are inserted into the bores 10, 9 and 6A respectively in the side pieces
25 1.

The insertion of the ends of the rods 20, 21 into the respective bores 10 and 9 requires a certain force and the partial elastic deformation of the ridges 10A, 9A on the inside of these bores. This deformation keeps the grid
30 19 connected to the side pieces 1 in an adequately secure manner and thus effectively secures the shelf components, aided by the engagement of the end rods 23A in the bores 12 of the lateral lugs 11.

The shelf of Figure 2 comprises the two side
35 pieces 1 and the front cover strip 17 as in the case of the shelf of Figure 1. It further comprises:
a) a rear cross-member 25, the ends 26 of which comprise

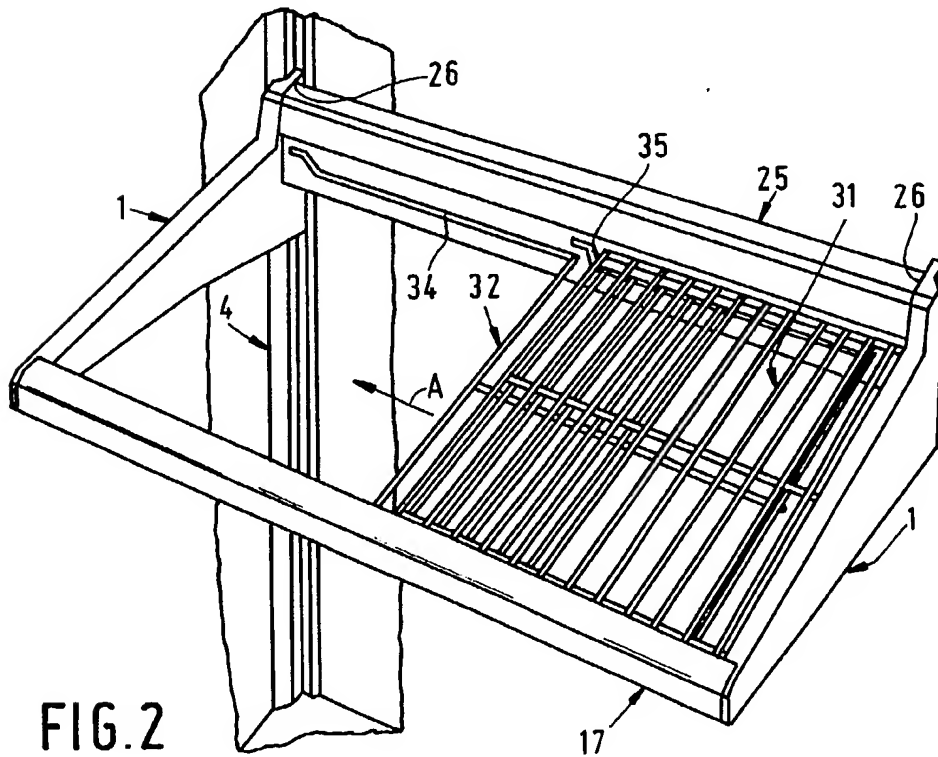
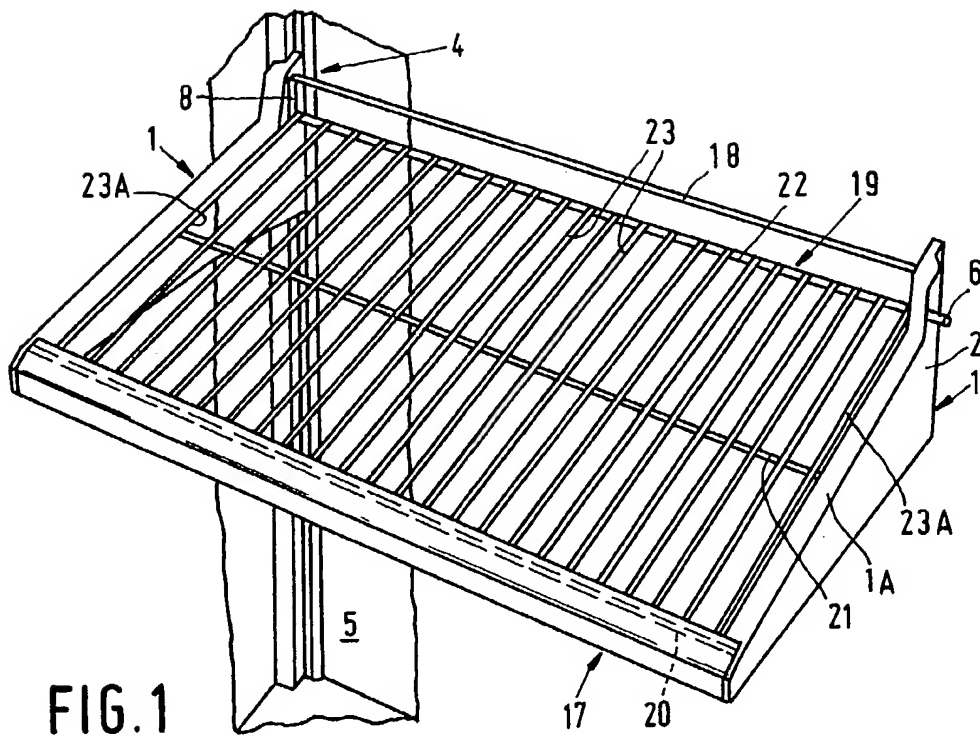
projections (not shown) which are inserted into the bores 6 and slots 8 in the side pieces 1 (stable fixing can be obtained in this case by welding, glueing or by screw means)

b) a front cross-member, which is not visible in the drawing because it is hidden by the corner strip 17, and which also comprises at its ends projections which are forcibly inserted into the bores 10 in the side pieces 1 and into recesses 30 formed in the inner sides of the side pieces 1 adjacent the front ends thereof;

and c) two half-grids 31, 32, of which one, 31, is fixed, supported by seats provided in the front and rear cross-members, and the other is slidable in guide grooves 34, 35 formed in the sides of the front and rear cross-members which face one another. The half-grid 32 can be moved by hand in the guide grooves in the direction of the arrow A from a position in which it is disposed below the fixed half-grid 31 (as shown in Figure 2) to a position in which it is disposed beside and in the same plane as the fixed half-grid. The configuration of the guide grooves which allows this movement of the half-grid 32 is clearly visible in Figure 2. The two end rods of the half-grid 32 engage slidably at their ends in the guide grooves 34 and 35 respectively in each of the front and rear cross-members, but the intermediate rods are slightly shorter than the end rods and do not extend into the grooves.

Figure 3 shows the shelf of Figure 1 with a removable drawer support fitted on a section of the grid 19 of the shelf. The drawer support can be positioned selectively on the grid; in Figure 3 it is shown fitted on the left-hand half of the grid as viewed from the front of the shelf. The drawer support is of inverted channel shape with two downwardly projecting flanges 36 which are inserted between appropriate rods of the grid 19, the flanges being formed with slots 35' to pass over the middle transverse rod 21 of the grid. Rails (not shown) are provided on the flanges 36 to slidably support a drawer 37 which can be used to contain, for example, butter and/or cheese.

1. A shelf constructed to be removably attached to supporting means to be supported thereon in the manner of a cantilever, characterized in that the shelf comprises mutually symmetrical plastics side pieces provided with lateral projections which can be inserted into seats in a pair of supports (4), and with engagement means for at least one element for interconnecting said side pieces.
2. A shelf as claimed in Claim 1, characterized in that the engagement means of each side piece, comprise transverse bores in the side piece, at least one recess in the side piece, at least one slot in the side piece and at least one bored lug on the side piece.
3. A shelf as claimed in Claim 2, characterized in that the wall of at least one of said transverse bores in each side piece is formed with a plurality axially extending ridges, the exerts of which lie on an imaginary substantially cylindrical surface.
4. A shelf as claimed in Claim 1, 2 or 3, characterized in that the side pieces are interconnected by a grid.
5. A shelf as claimed in Claim 1, 2 or 3, characterized in that the side pieces are interconnected by cross-members.
6. A shelf as claimed in Claim 5, characterized by a grid which is partially movable in guides formed in the cross-members.
7. A shelf as claimed in Claim 1, 2, 3 or 4, characterized by an extractable drawer.



2 / 4

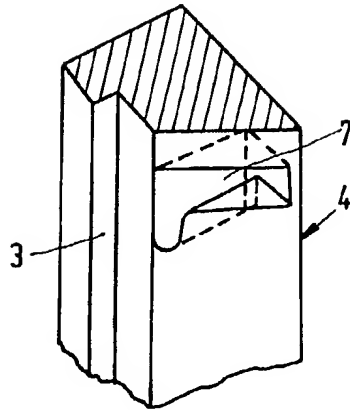


FIG. 11

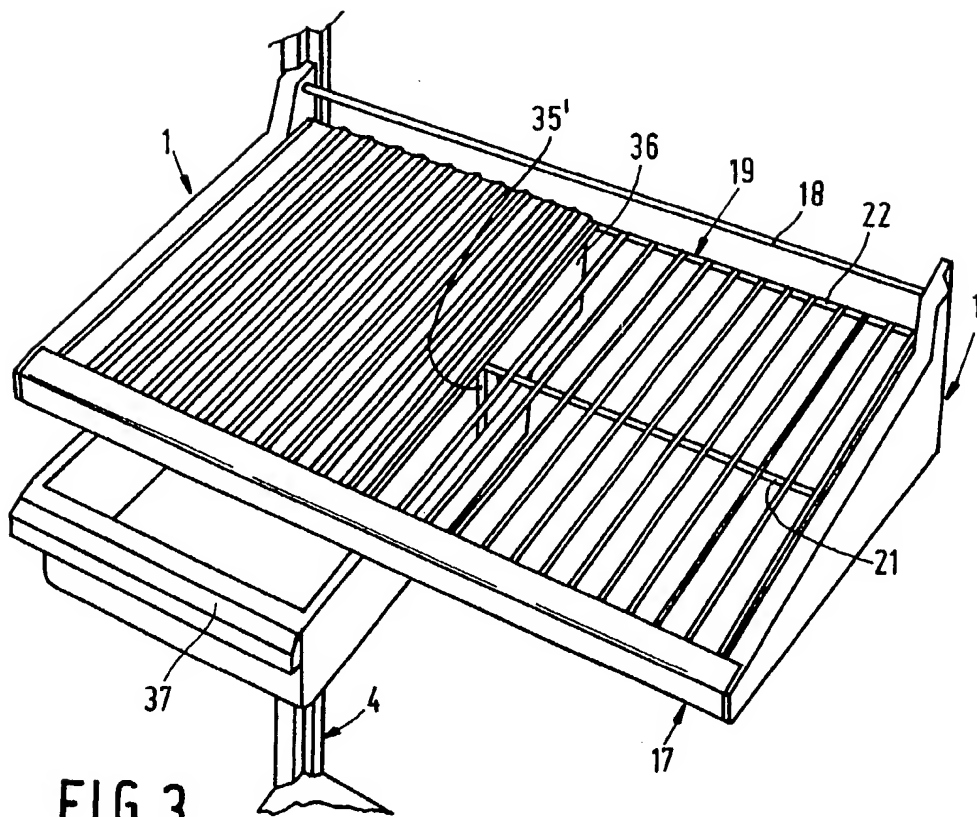


FIG. 3

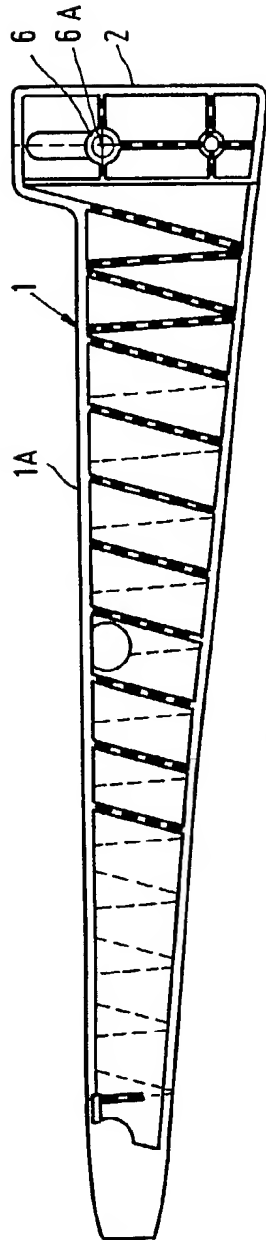


FIG. 4

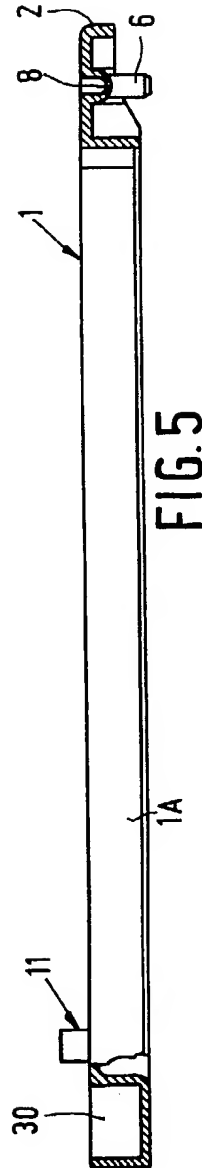


FIG. 5

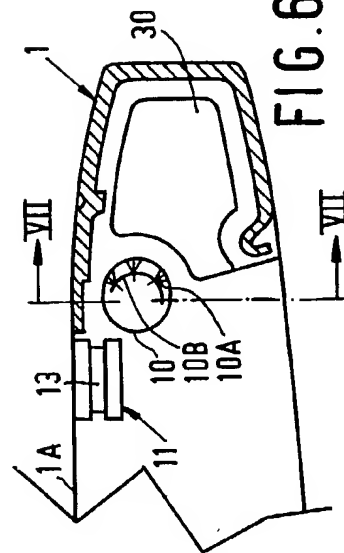


FIG. 6

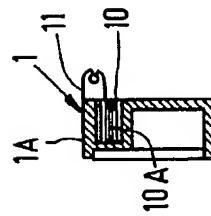


FIG. 7

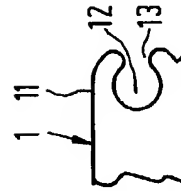


FIG. 8

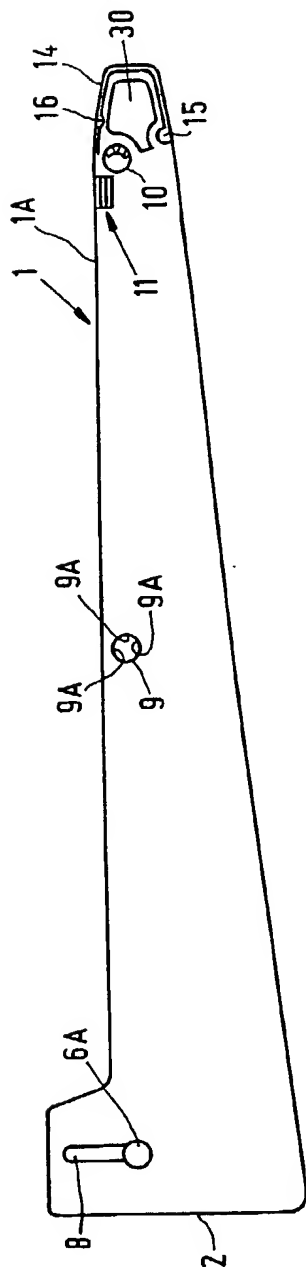


FIG. 9

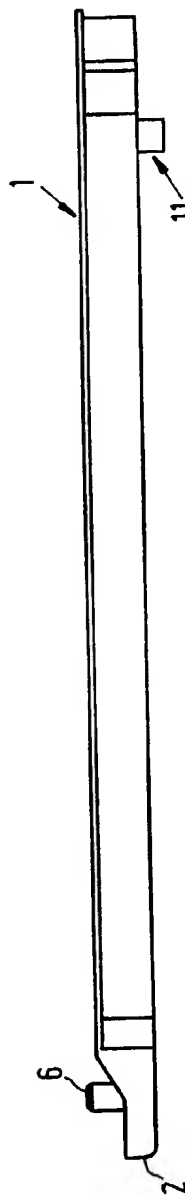


FIG. 10